LIFE COURSE CENTRE WORKING PAPER SERIES

Enriching the Rich? A Review of Extracurricular Activities, Socioeconomic Status and Adolescent Achievement

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No. 2018–17
September 2018

NON-TECHNICAL SUMMARY

International evidence suggests that children from more advantaged families spend more time in extracurricular activities (organised out-of-school activities such as sport, music lessons, or debating). This difference is potentially consequential because positive associations have been found between extracurricular activity participation and a range of academic outcomes. We reviewed the literature on this topic in order to determine whether differences in extracurricular activity participation contribute to disadvantaged adolescents' poorer outcomes later in life.

Our review found that more advantaged youth are more likely to participate in extracurricular activities, although there is still significant participation among disadvantaged children. In addition, more advantaged youth participated in a greater variety of activities, whereas disadvantaged adolescents were more likely to participate in sports alone.

These differences in participation rates and patterns appear to be mostly the result of economic differences. Youth from poorer families may struggle to pay activity fees, lack access to transport, or be constrained by parents' irregular work schedules or family responsibilities. However, there was also some evidence that non-material differences may play a part: more educated parents tended to value structured activity participation more highly, and may be better placed to find and take advantage of opportunities for their children.

We reviewed the effect of extracurricular activity participation on seven outcomes: high school grades and standardised test scores, high school graduation, college/university attendance, college/university graduation and overall education attainment, and employment and earnings in early adulthood. There was good evidence that participation was positively associated with grades and college attendance, at least in the United States. Evidence for the other outcomes was less consistent. There was no evidence that the effect of participation differed depending on the socioeconomic status of the participant.

Despite the fact that extracurricular activity participation rates are lower among disadvantaged youth, we found little compelling evidence that this participation gap significantly contributes to differences in outcomes. However, more well-designed studies are needed to answer this question with greater confidence.

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Acknowledgments: This research was supported by the Australian Research Council (ARC) Centre of Excellence for Children and Families over the Life Course (project number CE140100027). The Centre is administered by the Institute for Social Science Research at The University of Queensland, with nodes at The University of Western Australia, The University of Melbourne and The University of Sydney. The findings and views reported in this paper are those of the authors and should not be attributed to the ARC.

ABSTRACT

This paper reviews the literature on adolescent extracurricular activity participation, socioeconomic status and academic and labour market outcomes. We consider socioeconomic gradients of extracurricular activity participation in Australia and internationally, and contributors to the patterns found. The literature on the effect of extracurricular activity participation on academic and labour market outcomes in adolescence and early adulthood is also examined. Extracurricular activity participation is more common among more advantaged youths, a finding which is mostly attributable to budgetary and other objective constraints but may also be influenced by non-material family resources and values. There is good evidence that extracurricular activity participation positively affects grades and college attendance in the United States. However, based on the current literature we cannot conclude that the positive associations between participation and standardised test scores, college graduation, and labour market outcomes are anything more than correlational. This absence of high quality studies permitting causal inference was identified as a significant gap in the literature.

Keywords: extracurricular activities; adolescence; academic outcomes; labour market outcomes; intergenerational mobility

Suggested citation: Baldwin, E. & O'Flaherty, M. (2018). 'Enriching the Rich? A Review of Extracurricular Activities, Socioeconomic Status and Adolescent Achievement'. *Life Course Centre Working Paper Series*, 2018-17. Institute for Social Science Research, The University of Queensland.

1. Introduction

Social science has long been concerned with intergenerational inequalities, as the existence of such inequalities may undermine the social contract on which democratic societies are founded. Attempts to break the cycle of disadvantage in childhood often focus on the school system, yet extracurricular activities are another, potentially modifiable target for policy intervention.

Previous research has found socioeconomic disparities in organised activity participation in childhood and adolescence. In addition, positive correlations have been observed between extracurricular activity participation and academic and labour market outcomes (Feldman & Matjasko, 2005; Feldman Farb & Matjasko, 2012). If these associations are causal, addressing the extracurricular participation gap may help to narrow the achievement gap. We conducted a scoping review of the literature on both of these issues. Our findings are relevant to parents, schools, local communities, and policy makers at all levels of government.

We found that youth from high socioeconomic status (SES) families and communities have higher extracurricular activity participation rates than low SES children. Material resource constraints explain most of this gap, but differing values and levels of non-material resources are also influential.

Extra-curricular participation appears to positively affect grades and college attendance, but there is insufficient high quality evidence to conclude that it affects standardised test scores, educational attainment, or labour market outcomes in early adulthood. Overall, we found little evidence that extracurricular activity participation disparities significantly contribute to the transmission of intergenerational equality. However, more work is needed to determine the causal effects of extracurricular activities.

2. Methodology

Extracurricular activities are organised, voluntary activities which meet regularly outside of school hours and are supervised by adults. They tend to be rule-based and organised around particular skills (Bohnert, Fredricks, & Randall, 2010). They may be affiliated with the school, but not a mandatory part of the curriculum, or they may be community-based.

Previous reviews have assessed the effects of participation on a range of outcomes in adolescence, relying almost exclusively on U.S. studies (Feldman & Matjasko, 2005; Feldman Farb & Matjasko, 2012). We extend this work by focussing specifically on the patterns and consequences of extracurricular activity participation or non-participation for low SES youth.

We sought to answer three questions:

1. How does extracurricular activity participation vary by SES, in Australia and internationally?
2. What factors contribute to explaining this pattern?
3. What are the consequences of this pattern for academic, educational and labour market outcomes?

We conducted a search of electronic databases including Scopus, Web of Science, ERIC, FLoSse, PsycInfo, APA-FT, Australian Family and Society Abstracts, Sociological Abstracts, ProQuest Social Science database, ProQuest Education database, and A+ Education. Search terms described the activity (e.g. "extracurricular", "sport", "participation"), age group (e.g. "adolescent", "school", "youth") and, separately, SES (e.g. "class", "income") or consequences (e.g. "achievement", "outcome"). We located additional papers by examining the reference lists of key papers in the field.

Titles and abstracts were scanned to determine whether papers were relevant to this investigation. We excluded studies dealing with children younger than 10 or adults, as well as those concerned with daily "after school programs" or unstructured leisure activities. Studies examining the activity participation of particular groups of adolescents, such as recent immigrants, as opposed to a general population, were also beyond the scope of this review. Unpublished material and papers published in a language other than English were eliminated.

Among the papers which met these criteria, we gave particular attention to well-designed empirical studies: for example, longitudinal or natural experiment studies. Australian work and papers published since 2010 were also prioritised. (Feldman Farb and Matjasko's (2012) review included material published until 2009.)

3. Literature review

3.1 Socioeconomic distribution of extracurricular activity participation

Australian youth from high SES families have higher extracurricular activity participation rates than their low SES peers (Table 1). Mullan and Maguire (2013), using data from the Longitudinal Study of Australian Children (LSAC), reported that 81% of 10 year old children in high or moderate SES quartiles (classified according to parental income, education and occupation status) participated in organised sport outside of school, compared to 64% of children in the lowest quartile.

Participation in non-sport activities appears to follow a similar pattern (Fullarton, 2002; Mansour et al., 2016). Using survey data linked to Centrelink records, Ryan and Sartbayeva (2011) found that 31% of youth whose families had a history of intensive income support payments participated in a club or society at age 18, compared to 50% of youth with no family history of income support payments.

Similar trends have been observed in the United States. The pattern is robust to a variety of SES measures, including parental education, family income, and composite social class indices (Bouffard et al., 2006; McNeal, 1998; Weininger, Lareau, & Conley, 2015; White & Gager, 2007). Extracurricular participation has diverged over time in the United States: participation rates have increased for higher SES students and decreased for lower SES students in recent decades (Snellman, Silva, Frederick, & Putnam, 2015).

Neighbourhood and school SES are also correlated with extracurricular activity participation (Coulton & Irwin, 2009; Dollman & Lewis, 2010; McNeal, 1999; Stearns & Glennie, 2010). For example, Stratton, Conn, Smallacombe, and Liaw (2005) found that Australian children in the highest quintile of neighbourhood SES participated in organised sport and dancing at a rate 1.74 times that of an otherwise identical child in the middle quintile, whereas children in the lowest quintile were 40% less likely to participate than an equivalent middle-quintile child.

Other researchers have investigated the relationship between SES and different profiles of participation. Blomfield and Barber (2011), using Youth Activity Participation Survey of Western Australia data, found that students from low SES schools were more likely to participate in sports alone, whereas those attending high SES schools were more likely to

participate in a combination of sports and other activities. Feldman and Matjasko (2007) found a similar pattern in the United States.

A positive relationship has also been observed between SES and frequency and duration of extracurricular activity participation (Bouffard et al., 2006; Mata & van Dulmen, 2012). Weininger et al. (2015) reported that family wealth and maternal education positively predicted weekly time spent in extracurricular activities, though family income was not associated with time in activities in the United States. In Australia, Allen and Vella (2015) found that parental education, household income and neighbourhood SES positively predicted time in organised sport. Similarly, Fullarton (2002) found that SES positively predicted participation frequency. However, Mullan and Maguire (2013) and Stratton et al. (2005) found no evidence that the frequency or duration of activity participation differed by SES.

Overall, higher SES adolescents are more likely to participate in any extracurricular activity and more likely to participate in a variety of activities rather than sports alone. There is some evidence that higher SES children spend more time in activities and participate more often but this finding is less robust, especially in Australia.

3.2 Reasons for differential patterns of participation

Material resources

Differing levels of a range of resources explain a large part of the extracurricular activity participation gap. Activities frequently involve direct (e.g. registration fees) and indirect (e.g. transport, time) costs which may be prohibitively expensive for low SES families (Chin & Phillips, 2004; Holt, Kingsley, Tink, & Scherer, 2011; Humbert et al., 2006). A U.S. survey found that 19% of families earning less than $60,000 per year had reduced their children's participation in school sports in response to cost increases, suggesting that in many cases financial constraints are the decisive factor in determining children's activity participation (C.S. Mott Children's Hospital, 2012). Even when waivers or other schemes to increase accessibility are in place, the social stigma associated with accessing such programs limits their effectiveness (Hoff & Mitchell, 2006).

However, even when budgetary constraints are relaxed by welfare programs, or analysis is limited to free school-based or government programs, participation rates among low SES children remain relatively low (Epps, Huston, & Bobbitt, 2013; Kane, 2004; Weininger et al., 2015). Other practical barriers may explain these findings, including inflexible parent work schedules, lack of transport, family responsibilities such as childcare, concerns about neighbourhood safety, and lack of facilities and opportunities in low SES neighbourhoods and schools (Chin & Phillips, 2004; Coulton & Irwin, 2009; Dollman & Lewis, 2010; Holt et al., 2011; Humbert et al., 2006; Stearns & Glennie, 2010).

Other influences

Differences in objective resources account for a large part of the extracurricular activity participation gap. However, even after controlling for income and other objective resources, maternal education has a consistently significant, positive association with extracurricular activity participation. This suggests that material resource constraints are not the only factor influencing low SES youths' participation (Fullarton, 2002; Mata & van Dulmen, 2012; Weininger et al., 2015). This may reflect differences in parents' human, cultural and social capital: education may enhance parents' insight into their children's needs, knowledge of extracurricular opportunities available, and ability to enact these ideas (Chin & Phillips, 2004). The education effect may also reflect differences in parenting values (Weininger et al., 2015). Lareau (2002) postulated that middle class parents engage in "concerted cultivation" of their children, actively attempting to foster their talents with extracurricular and other activities, whereas working class parents favoured the "accomplishment of natural growth," caring for the child's needs but not managing their leisure activities. There is some empirical support for this hypothesis: parental class background appears to influence beliefs about the importance of concerted cultivation and structured activities (Roksa & Potter, 2011; Streib, 2013).

Overall, differences in family and community levels of objective resources appear to be the most important factor in explaining the extracurricular activity participation gap in adolescence. However, non-material resources and cultural values also contribute to the participation gap.

Study	Country; data source	Measure of SES	Measure of participation	Other variables	Findings
Patterns with SES					
Allen and Vella (2015)	Australia; LSAC (12 years)	Parental education, household income, neighbourhood SES	Weekly hours in organised sport	Controls: gender, indigenous status, language other than English, pubertal status, general health, parental BMI, parental physical activity, neighbourhood remoteness/ belonging/ safety	Parental education, household income and neighbourhood SES predicted time in organised sport.
Bennett, Lutz, and Jayaram (2012)	United States; 51 parents (13-14 years)	Middle class/ working class based on parents' education level	Children's participation levels, beliefs about extracurricular activities		Middle class children participated in more activities on average. Participation in non-school-based activities much more polarised than school-based participation. Few differences between middle and working class parents' beliefs about activities but differences in financial and community institutional resources affect ability to actualise these beliefs.
Blomfield and Barber (2011)	Australia; Youth Activity Participation Study of Western Australia (YAPS-WA) (12-16 years)	Tertiles of Index of Community Socio-Educational Advantage (ICSEA) for each school	Sport and non-sport school-based extracurricular activities		Students at low SES schools have highest levels of non-participation (15.1%) and sports-only (49.1%) and lowest level of sport and activity participation (28.8%). Students at high SES schools have highest levels of sport and activity participation (60.2%) and lowest level of non-participation (4.8%) and sport-only (25.3%).
Bouffard et al. (2006)	United States; National Education Longitudinal Study of 1988 (NELS:88) (15-18 years)	Family income, parental education	10^{th} grade and 12^{th} grade participation in arts lessons, sports lessons, school extracurricular activities; weekly time spent in school extracurricular activities; frequency of arts lessons, sport lessons	Controls: gender, race	For both 10^{th} and 12^{th} grade, both income and parental education positively associated with participation in arts lessons, sports lessons and school extracurricular activities, and intensity of participation in school extracurricular activities.

Study	Country; data source	Measure of SES	Measure of participation	Other variables	Findings
C.S. Mott Children's Hospital (2012)	United States; National Poll on Children's Health (12-17 years)	Low-income: income less than $60,000 per year. High-income: income greater than $60,000 per year	Participation in school sports		61% of schools charged a fee to participate in sports. 19% of low-income families reported that the cost of school sports had caused a decrease in participation for at least one of their children compared to 5% of high-income families.
Coulton and Irwin (2009)	United States; Making Connections survey (low-income neighbourhoods) (5-17 years)	Parental education, neighbourhood safety rating, neighbourhood poverty rate	At least weekly participation in organised out-of-school activities	Controls: age, race, child health, years in neighbourhood, satisfaction with child's school, taken action to improve neighbourhood, volunteers in neighbourhood, percentage non-white in neighbourhood	Higher parental education positively predicted participation. Neighbourhood safety rating positively predicted participation. Poverty rate did not predict participation.
Feldman and Matjasko (2007)	United States; National Longitudinal Study of Adolescent to Adult Health (Add Health) (11-18 years)	Class quintiles based on education level and occupation of highest classified parent	School-based extracurricular participation profile: sports only, academic only, school only, performance only, multiple activity types, non-participation	Controls: grade, gender, race, GPA, hours working, school size, school urbanicity, school location	Lower and lower-middle less likely to participate in multiple activities than middle class. Upper-middle more likely to participate in multiple activities than middle class.
Fullarton (2002)	Australia; Longitudinal Surveys of Australian Youth (14-15 years)	Mother's education Father's occupation, mother's education, independent school School average of extracurricular activity participation	Participation in sport, music, debating, drama, community activities Composite measure of frequency of participation in all activities	Controls: gender, Indigenous status, home language, parents' country of birth, student's aspirations, class climate, school climate, self-concept of ability, quality of school life, Catholic school, coeducational school, school size, problems with school, parental involvement, teacher satisfaction with school, relationships with others, school success	Students with university-educated parents had highest participation levels for all activities except drama. Largest relative differences for music and debating. Father's occupation, mother's education and independent school status positively predicted participation frequency. Average school level of participation positively predicted individual participation frequency. In presence of this variable, father's occupation

Study	Country; data source	Measure of SES	Measure of participation	Other variables	Findings
				broadly, school success academically, teachers' rating of other teachers	and independent school status no longer predicted participation.
Gracia-Marco et al. (2010)	Spain; AVENA study (13-18 years)	Father's education, mother's education	Extracurricular sports participation		Father's education, but not mother's education, positively predicted sport participation for boys and girls
Mansour et al. (2016)	Australia; 1172 students (11-18 years)	Parental education, parent occupation, school ICSEA	Time in out-of-school arts tuition	Controls: age, gender, non-English speaking background, Aboriginal status, prior academic achievement, school size, elementary/ secondary school	Parental education positively predicted time in arts tuition. Parent occupation and school ICSEA did not.
Mata and van Dulmen (2012)	United States; National Institute of Child Health & Human Development Study of Early Child Care (0-15 years)	Income-to-needs ratio, maternal education	Trajectory of organised activity participation over time: decreasing low, decreasing moderate, increasing moderate, increasing high (compared to stable low trajectory)	Controls: gender, aggression, delinquency, anxiety/ depression	Income-to-needs positively predicts membership of all four participation categories compared to stable low. Maternal education positively predicts membership of decreasing moderate, increasing moderate and increasing high, but is a less important predictor than income-to-needs.
McNeal (1998)	United States; NELS:88 (15-16 years)	SES measure derived from father's occupation, parental education, family income and household possession index	Participation in school-based activities: athletics, cheerleading, fine arts, academics, newspaper/ yearbook, service/ government, vocational activities	Controls: held back a grade, single parent household, test scores, GPA, hours of homework, hours worked, prior participation in similar activity	Higher SES positively predicted participation in athletics, cheerleading, fine arts, newspaper/ yearbook and service/ government. Higher SES negatively predicted participation in vocational activities. SES did not predict involvement in academic activities.
McNeal (1999)	United States; High School and Beyond (HSB) (15-16 years)	Number of students, student/ teacher ratio, problematic school climate (unsafe environment, problems with crime, verbal and physical	Number of school-related activities, athletics participation	Controls: race, gender, age, SES, academic/ vocational track, hours worked, percentage single parent, percentage of minority students, academic emphasis	Number of students and problematic school climate negatively related to number of activities and athletics participation. Higher average SES negatively associated with general activity participation; not associated with athletic participation. Student/ teacher ratio did not predict either variable.

Study	Country; data source	Measure of SES	Measure of participation	Other variables	Findings
		conflict), average SES			
Mullan and Maguire (2013)	Australia; LSAC (10-11 years)	SES quartiles based on family income, parental education and occupational status	Any participation in organised sport and dancing, time in organised sport/ dancing		Higher participation rate among high/ moderate SES youth than low SES youth. No statistically significant difference in time spent in activities.
Nielsen, Gronfeldt, Toftegaard-Stockel, and Andersen (2012)	Denmark; Copenhagen School Child Intervention Study (9-10 years)	Parents' formal job qualifications	At least weekly participation in organised sport	Mediators: material resources, income, social resources, parents' sport participation and parents' value of physical activity as mediators	Children whose parents both had formal job qualifications had 1.8 times higher odds of sport participation. The effect of formal job qualifications becomes insignificant when adjusted for parents' sport participation and values.
Ryan and Sartbayeva (2011)	Australia; Youth in Focus survey (18 years)	Family history of receipt of income support payments	Member of club or society		Youth with no history of income support highest participation rate (49.9%); youth with intensive income support history lowest participation rate (31.1%).
Snellman et al. (2015)	United States; National Longitudinal Study of 1972, HSB, NELS:88, Education Longitudinal Study of 2002 (ELS:2002) (14-18 years)	SES quartile based on income, parental education and parental occupational status	School-sponsored activity participation rate		Higher proportion of high SES youth participated in sport and non-sport activities than low SES youth. Participation rates for high SES youth have increased over time whereas low SES youths' participation has decreased over time.
Stearns and Glennie (2010)	United States; North Carolina high schools	Percentage of students receiving free lunch	Total number of activities available; availability of academic, ethnic, honours, media, music, recreational sport, service, sport and vocational activities	Controls: urbanicity, percentage minority students, school size, student/ teacher ratio	Percentage of students receiving free lunch negatively predicted total number of activities and presence of honours, service and sport activities. Did not predict presence of ethnic, media, music, recreational sports or vocational activities.
Stratton et al. (2005)	Australia; Australian Bureau of Statistics Children's Participation in	Socio-Economic Index for Areas (SEIFA) quintiles,	Participation in organised sport or dancing, time in organised sport or		SEIFA quintile positively associated with participation. Parental unemployment negatively associated with participation. Membership of second, fourth or fifth quintile

Study	Country; data source	Measure of SES	Measure of participation	Other variables	Findings
	Cultural and Leisure Activities survey (5-14 years)	employment status of parents	dancing, frequency of participation in organised sport or dancing		negatively associated with time in activities (relative to middle quintile). Mixed patterns with parental unemployment and time in activities. Membership of fourth or fifth quintile negatively associated with frequency of participation. Parental unemployment negatively associated with frequency of participation.
Weininger et al. (2015)	United States; Panel Study of Income Dynamics – Child Development Supplement (PSID-CDS) (6-15 years)	Permanent (five year average) income, permanent wealth, occupation category, maternal education, neighbourhood quality, neighbourhood safety, neighbourhood social capital, private school attendance, vehicle ownership	Weekly time in organised activities	Controls: race, age, gender, health, family composition, location, neighbourhood urbanicity, parental hours worked and overtime	Permanent wealth, maternal education and private school attendance predicted time in activities. Permanent income, home ownership, professional occupation status, vehicle ownership, and neighbourhood quality/ safety/ social capital did not predict time in activities.
White and Gager (2007)	United States; Survey of Adults and Youth (10-18 years)	Receipt of food stamps, social welfare services, family income, financial worries	School and non-school extracurricular activities	Controls: gender, age, race, urbanicity, family structure, time spent on paid work, time spent on household labour, time spent watching television	Food stamps negatively predicted non-school activities but did not predict school activities. Welfare services did not predict school or non-school activities. Higher family income positively predicted school but not non-school activities. Financial worry negatively predicted school and non-school activities.
Reasons for patterns					
Chin and Phillips (2004)	United States; ethnographic study of 32 children (9-10 years)	Middle/ working class based on parental education, income and occupation	Organised activities over summer		Middle class children participated in more organised activities over summer than working class children. This difference was due to middle class parents' greater access to financial, human, cultural and social capital. Working class parents desired greater activity

Study	Country; data source	Measure of SES	Measure of participation	Other variables	Findings
					participation for their children but lacked the resources to enact this desire.
Dollman and Lewis (2010)	Australia; 1737 adolescents (10-15 years)	SEIFA, mother's education, father's education SEIFA tertiles	Sport participation in last year Enablers of participation (availability of transport and facilities)	Controls: age, gender Controls: age	SEIFA predicted sport participation. Parental education did not predict participation. High SES youth had higher levels of enablers than medium and low SES youths. High SES boys had greater access to opportunities. High SES girls had higher transport availability.
Epps et al. (2013)	United States; 745 participants in New Hope experiment (6-19 years)	New Hope participation (received earnings supplements, child care subsidies and health care subsidies) or control group	Frequency of participation in extracurricular activities		No difference between New Hope participants and control group from child report data. Mean activity participation marginally higher for New Hope participants when using parent report data.
Holt et al. (2011)	Canada; interviews with 18 low-income children (mean age 12.5 years)		Barriers to sport participation		Time management and scheduling (especially if parents working multiple jobs) and financial constraints as children progress in the sport (including indirect costs e.g. transport) were the main barriers to participation.
Humbert et al. (2006)	Canada; focus groups with 160 adolescents (12-18 years)		Barriers to physical activity and sport participation		Both high and low SES youth indicated that time constraints, perceived skill, and involvement of friends influenced physical activity and sport participation. Low SES youth uniquely identified safety, cost, proximity and quality of facilities as barriers to participation.
Roksa and Potter (2011)	United States; PSID-CDS (6-14 years)	Current social class and class background based on education level of mother and grandmother	Concerted cultivation (composite of organised activity participation, parent involvement with child's school and parent-child discussion)	Controls: gender, race, child's age, mother's age, immigrant status, father's education, number of siblings, two-parent household, income, mother not working, home ownership	No difference between new and stable middle class parents. New working more likely than stable working class parents to engage in concerted cultivation. Magnitude of effects small.

Study	Country; data source	Measure of SES	Measure of participation	Other variables	Findings
Streib (2013)	United States; interviews with 54 college graduate parents	One parent middle class background, one parent working class background	Parenting beliefs		44% of middle class origin parents believed it was important to structure their children's time, compared to 15% of their working class origin partners.

Table 1: Selected studies examining extracurricular activity participation and SES.

3.3 Effects of extracurricular activity participation on achievement

Extracurricular activities have been theorised to affect achievement in several ways. Activities may foster the development of cognitive or noncognitive skills; provide a positive peer group and enhance social capital; or positively affect adolescents' academic self-concept, educational outlook and school attachment (Blomfield & Barber, 2010; Broh, 2002; Morris, 2016).

However, there is little high quality empirical evidence regarding the causal effects of extracurricular activity participation. Since almost all studies rely on observational data and participation is voluntary, self-selection is a key issue. Though controls for basic demographic variables are often included, the multiplicity of factors which can affect adolescents' decisions to participate in extracurricular activities means that omitted variable bias remains a significant problem (Feldman & Matjasko, 2005, p. 199).

Well-designed longitudinal studies provide stronger evidence of the causal effects of extracurricular activities, and alternative techniques such as instrumental variable estimation have also been used. We considered the effect of extracurricular activity participation on grades, standardised test scores, high school graduation, college enrolment, post-secondary educational attainment, employment and earnings (Table 2).

Grades

Fredricks and Eccles' (2006, 2010) work is typical of many studies in this field. They predicted 11th grade GPA from extracurricular activity participation in the same year, controlling for eighth grade GPA, motivation, and demographic variables including SES. Breadth of participation, measured by total number of activities, was positively associated with GPA.

These, and similarly designed, papers can only provide suggestive evidence that extracurricular activity participation affects grades. While the inclusion of a baseline measure of GPA controls for time-invariant omitted variables, endogeneity bias may still arise if changes in time-varying variables such as motivation, ambition, or parental support affect both extracurricular participation and grades.

Broh (2002), Darling, Caldwell, and Smith (2005) and Im, Hughes, Cao, and Kwok (2016) all attempted to address this issue by using consistency of participation over time as their independent variable. Broh reported that participation in competitive sport, music or student council in both 10th and 12th grades was positively associated with 12th grade mathematics and English grades, controlling for the 10th grade measure of the outcome variable, demographic and school variables. Consistent participation in drama or student journalism was positively associated with English grades only. Participation in vocational clubs, recreational sport, and cheerleading was negatively associated or unrelated to grades. However, Im et al. (2016) used a sample of children who achieved poor literacy results in kindergarten. They found that while consistent participation in seventh and eighth grades in performing arts or clubs positively predicted eighth grade English grades, sport participation had no effect. They accounted for a wide range of potential confounders, including socioemotional characteristics, prior standardised test scores, attitude to school, and parental involvement, through propensity score weighting, reducing the likelihood that these findings are biased by omitted variables.

Marsh and Kleitman (2002) also used a rich longitudinal dataset to address this question. They predicted grades in 12th grade from the number of 10th and 12th grade school and non-school-based activities ('breadth'), and the sum of time spent in school-based activities in 10th and 12th grades ('intensity'). They controlled for demographic variables as well as eighth and 10th grade grades, standardised test scores, homework completion, attendance, and other academic variables. Marsh and Kleitman found that breadth and intensity of school-based activity participation positively predicted grades, but breadth of non-school-based activities was negatively associated with this outcome. The authors explain the divergent results by suggesting that the positive effect of school-based extracurricular activities may be due to increased school identification or commitment, rather than a more general mechanism such as development of noncognitive skills. Alternatively, the conflicting findings could be attributable to unobserved differences in the type or quality of activity available at school compared to outside of school.

Foster and Jenkins (2017) calculated propensity scores for participation in dance, drama and music lessons on the basis of demographic variables, health, standardised test scores, parent involvement, behaviour and psychological traits. Inverse probability weights were then used to equate the participating and non-participating groups. Using the weighted scores, the

authors found no evidence that performing arts or music lessons positively affected high school GPA.

Rees and Sabia (2010) used height to instrument for sport participation, and found that this activity did not affect GPA. Rees and Sabia control for cognitive ability and puberty, and then claim conditional exogeneity of the instrument.

Though there are some contradictory findings, overall it appears that some forms of extracurricular activity participation positively affect grades. A further question is whether this effect is meaningful in size. Shulruf (2010) conducted a meta-analysis of the relationship between school-based extracurricular activities and academic outcomes. Effect sizes in most cases were small, and he concluded that there was no evidence of a meaningful causal relationship between extracurricular activities and academic outcomes.

Standardised test scores

There is mixed evidence regarding the effect of extracurricular activities on standardised test scores. Morris (2016) and Marsh and Kleitman (2002) reached opposite conclusions in well-designed longitudinal studies. Morris found that, controlling for 10th grade mathematics test scores and some demographic and school characteristics, time spent in extracurricular activities in 10th grade positively predicted 12th grade standardised mathematics test scores. By contrast, Marsh and Kleitman's extensively controlled longitudinal study found that participation in both school- and non-school-based activities was negatively related or unrelated to standardised test scores in mathematics, reading, history and science.

Marsh and Kleitman's inclusion of reading, history and science scores may partly explain why they reached a different conclusion to Morris, who only considered mathematics scores. Broh (2002) found that consistent sport participation was positively associated with mathematics test scores but not reading scores.

Other work is similarly inconclusive. Lipscomb (2007) used a fixed effects design to investigate the effect of school-based sport and club participation on mathematics and science standardised test scores. This approach, which exploits changes in participation from eighth to 12th grade to predict changes in test scores, eliminates time-invariant omitted variable bias. Lipscomb also controlled for several time-varying variables, including parental divorce or

death and shocks to SES, school characteristics, self-esteem, truancy, and time spent on other activities. Sport participation was positively associated with both mathematics and science test scores, whereas club participation was not robustly associated with either outcome.

Thus, there is no consensus in the literature regarding the effect of extracurricular activities on standardised test scores. Different activities appear to produce different effects, and these effects may differ by subject. However, the topic has been insufficiently studied to draw conclusions at this level of detail.

This relative lack of study may explain the more robustly positive results for the effect of extracurricular activities on grades. Alternatively, extracurricular activities may in fact have a greater or more consistent effect on grades than standardised test scores. This could suggest that participation positively affects grades through mechanisms other than cognitive skill enhancement. For example, participation may promote the development of noncognitive skills which are more important for grades than standardised test scores (Borghans, Golsteyn, Heckman, & Humphries, 2016), or, in line with Bourdieu's (1973) theory of cultural reproduction, teachers may view students who participate in activities more favourably, which could translate into higher grades but not standardised test performance (but see Dumais, 2006).

High school graduation

The literature is also inconsistent on the effect of extracurricular participation on high school dropout. Early work by Mahoney and Cairns (1997) and McNeal (1995) found that extracurricular participation generally protected against dropout, though in the case of McNeal (1995) this benefit was limited to sports and arts activities; academic and vocational clubs had no effect. However, these studies were poorly designed, with few controls for self-selection.

Anderson (2001) addressed this endogeneity problem by using peers' rates of participation in sports, other extracurricular activities, and part-time jobs to instrument for sport participation during 12^{th} grade. Controlling for prior standardised test scores, demographics, and school characteristics, she found that sport participation was associated with reduced high school dropout for white but not minority students. First stage results indicated that the instruments were strong predictors of individual sport participation. However, though Anderson included

some controls for school characteristics and resources, other factors, such as school culture, may be correlated with both the instrument and outcome, in which case Anderson's conclusions are unreliable.

More recent work by Foster and Jenkins (2017) and Ransom and Ransom (2017) found little evidence that extracurricular activity participation reduced the risk of high school dropout. Foster and Jenkins, in their propensity score analysis described above, found no evidence that participation in arts lessons increased the likelihood of high school completion. Ransom and Ransom took a novel approach to the issue. They estimated the effect of sport participation on high school graduation in several longitudinal U.S. datasets, controlling for observed variables including cognitive ability, demographics and school characteristics. They then evaluated the robustness of these estimates by calculating the amount of selection on unobservables, relative to selection on the observed controls, which would be required in order for the apparent effect to be statistically indistinguishable from zero. They found ratios of 0.14 to 0.38, implying that if selection on unobservables is greater than 38% of selection on observables, sport participation has no effect on high school graduation. Employing a rule of thumb that a causal effect can be claimed if the ratio is greater than one, they conclude that any positive correlation between sport participation and high school graduation observed is likely to be the result of omitted variables rather than a causal effect.

Thus, there is little high quality evidence that extracurricular activity participation reduces the probability of high school dropout.

College attendance

Examining the causal effect of extracurricular activities on college attendance is more difficult than grades or standardised test scores because longitudinal data cannot provide a prior measure of the outcome. Instead, scholars often control for GPA, standardised test scores, or educational expectations, but these are imperfect proxies, and conclusions regarding causal effects are necessarily weaker.

Most longitudinal studies based on U.S. data conclude that extracurricular activity participation is positively linked to college attendance (Eccles & Barber, 1999; Fredricks & Eccles, 2006; Gardner, Roth, & Brooks-Gunn, 2008; Sabo, Melnick, & Vanfossen, 1993). For example, Fredricks and Eccles (2010) predicted college enrolment one year after high

school from 11th grade school- and community-based activities, controlling for demographics and eighth grade educational expectations and motivation. They found a positive association between breadth of participation and college attendance. However, this result may be biased by omitted variables: factors which positively affect both propensity to participate in extracurricular activities in 11th grade and college attendance, but were not captured in eighth grade educational expectations or motivation.

Zaff, Moore, Papillo, and Williams (2003) included controls for a wider range of eighth grade variables, such as standardised test scores, parental monitoring and involvement, locus of control, peer influence, and emotional disability, reducing the risk of time-invariant omitted variable bias. They found that greater consistency of extracurricular participation in eighth to 12th grade was associated with a higher likelihood of attending college two years after high school, and even occasional participants were more likely to attend than those who never participated.

Similarly, Marsh and Kleitman (2002), in their longitudinal study, found that breadth and intensity of school-based activity participation were positively related to college enrolment and months of college attendance two years after 12th grade, whereas non-school-based activities had no effect. This finding is particularly credible because they controlled for a wide range of academic variables measured in eighth and 10th grade. Indeed, if extracurricular activity participation positively affects grades or standardised test scores, which in turn may affect college attendance, the inclusion of these variables as controls may have led to an underestimation of the effect of extracurricular activities on college enrolment. As discussed above, the differing results for school- and non-school-based activities may be because of differences in the type or quality of activities available, or because school-based activities positively affect outcomes through increases in school or academic identification and commitment.

Overall, extracurricular activity participation during high school appears to lead to an increased likelihood of college enrolment. However, the conclusion is not without dispute. Ransom and Ransom (2017) applied their technique of comparing selection on unobservables to selection on observables to test the robustness of associations between sport participation and college attendance. In most cases, if selection on unobservables was even a moderate fraction of selection on observables, the estimated effect of sport participation was

indistinguishable from zero, leading the authors to conclude that sport participation was unlikely to have a causal effect on college attendance.

Ransom and Ransom's (2017) work highlights that concerns about self-selection and omitted variable bias may materially affect the validity of findings in the literature. Nonetheless, the available longitudinal evidence is consistent with a positive effect of extracurricular activity participation on college attendance in the United States. However, this result is not necessarily generalisable to other countries: extracurricular activity participation is explicitly considered in the college admission process in the United States, but this is rarely the case in Australia, for example (Gabler & Kaufman, 2006). Few studies outside the U.S. have considered the educational effects of extracurricular activities (Pfeifer & Cornelißen, 2010, is an exception). One study from Ireland, where tertiary admission is determined by examination results, found that sport participation did not predict participation in further education two years after adolescents left school, though those who dropped out of sport were less likely to be in further education (Lunn & Kelly, 2015). This suggests that there may be cross-country differences in the effect of extracurricular activity participation on college enrolment. Further work from a wider range of countries is needed.

College graduation and further educational attainment

Determining the causal effect of extracurricular activities on post-secondary educational attainment, six or more years after participation was measured, is inherently difficult, and the literature must be interpreted with caution.

Gardner et al. (2008), Troutman and Dufur (2007) and Lleras (2008) all found positive associations between high school extracurricular activity participation and post-secondary educational attainment in longitudinal U.S. data, though Gardner et al.'s and Troutman and Dufur's results may have been biased by omitted variables. Lleras' study was better controlled: she estimated the effect of 10th grade extracurricular activities on educational attainment eight years after high school, controlling for 10th grade demographics, standardised test scores, homework completion, and traits including work ethic and peer relationships. She found that sport and academic, but not fine art, activities, positively affected educational attainment.

By contrast, Eisman, Stoddard, Bauermeister, Caldwell, and Zimmerman (2017), in a sample of disadvantaged African-American adolescents, found no evidence that high school activity participation was associated with lifetime educational attainment. Similarly, Eide and Ronan (2001) used height to instrument for sport participation, and found no effect on college graduation rates for males but a positive effect for white females. However, given that height is positively correlated with cognitive ability, this instrument may be invalid.

Stevenson (2010) used a natural experiment to provide the most credible instrumental variable estimation of the effect of sport participation. She exploited the fact that there was geographic variation in the implementation of Title IX, U.S. legislation which required states to increase female sport participation levels to achieve parity with men, because of differences in pre-existing male sport participation rates. These prior rates are her instrument. She concluded that sport participation positively affects years of education for women.

However, Ransom and Ransom (2017) found that if selection on unobservables is even a moderate fraction of selection on observables, there is no causal effect, leading the authors to conclude that the evidence for this effect is weak.

Thus, there is inconsistent evidence on the effect of extracurricular activities on educational attainment. Further research that provides more robust grounds for causal inference, for example good natural experiments or sibling/twin designs, is required.

Labour market outcomes

The effect of extracurricular participation on labour market outcomes, chiefly earnings and unemployment, in early adulthood has also been investigated. These outcomes are of particular interest for the intergenerational transmission of disadvantage, but given the long time interval between measurement of activity participation and this outcome, determining the causal effect of participation is difficult.

Controlling for demographic variables and high school standardised test scores, behaviour and parent networks (but not post-secondary educational attainment), Gardner et al. (2008) found that consistency of extracurricular participation in high school had no effect on employment or income eight years after 12^{th} grade. This result is surprising because the authors found that participation positively affected post-secondary educational attainment,

and this variable is positively associated with employment and income (Carnevale, Rose, & Cheah, 2011). However, earnings differences between university graduates and non-graduates increase over time; thus, it is possible that an effect would be observed if measured later in life (Carnevale et al., 2011).

Cabane and Clark (2015) also found that extracurricular activities had no effect on labour market outcomes. Controlling for demographics, educational attainment, health, work experience, and other factors, they found that adolescent team sport participation did not affect earnings, employment or job satisfaction for men or women at age 24-32. However, because the authors controlled for educational attainment, health, and other factors which could themselves be positively affected by sport participation, it is possible that their study did not capture sport's positive effect on earnings through these channels.

By contrast, Kosteas (2010) found a positive association between high school extracurricular activities and earnings at age 42-49. He used observations on multiple individuals in a household to account for family-specific fixed effects, and also controlled for cognitive ability, educational attainment, and occupation. Kosteas' work diverges from Cabane and Clark's (2015) in finding a positive effect of extracurricular activities on earnings even after accounting for its possible effect on educational attainment. This difference may be attributable to the different ages at which earnings were measured: for example, extracurricular activities may foster particular noncognitive skills which are more important later in an individual's career. However, while Kosteas' approach controls for omitted variables at the household level, the effect may still be attributable to unobserved individual differences which affect both activity participation and earnings.

Stevenson (2010), in her natural experiment study, also found a positive effect: state-level female athletic participation was positively associated with the female employment rate.

Thus, the literature on the effect of extracurricular activities on labour market outcomes is mixed. We cannot yet conclude that extracurricular activity participation positively affects labour market outcomes in early or later adulthood.

3.3.1 Interactions with SES

Extracurricular activity participation may have differential benefits for youth depending on their socioeconomic background. For example, skill development and adult support experiences in extracurricular activities may compensate for lower SES youths' relative lack of such opportunities, in which case larger participation benefits would be expected for this group – the 'resource compensation' theory (Morris, 2015, p. 271). Alternatively, Bourdieu's (1973) theory of cultural reproduction implies that higher SES youth receive greater benefit from participation in cultural activities such as extracurricular activities (Dumais, 2006; Jæger & Møllegaard, 2017). Several papers have investigated this question empirically.

Morris (2015) estimated the effect of extracurricular activity participation on 12th grade mathematics scores separately for each SES quintile and category of parental education. He found that participation had a positive effect only for those in the lowest three quintiles; there was no benefit for higher SES adolescents, supporting the resource compensation theory.

Using Australian data, Blomfield and Barber (2011) found a significant negative interaction between school SES and extracurricular participation in predicting academic self-concept, suggesting that students from lower socioeconomic schools received greater benefit from activity participation. Similarly, Lleras (2008) found that individuals from low SES backgrounds received a greater earnings benefit from participation in sports and academic activities, though there was no special effect for educational attainment.

However, most studies have found that the interaction between SES and extracurricular participation was insignificant, indicating that effects were the same for all youth (Fredricks & Eccles, 2006, 2010; Mahoney & Vest, 2012; Morris, 2016). Marsh and Kleitman (2002) found some significant interactions between participation and SES, but noted that the addition of these terms contributed little to explaining the variance in the academic outcomes under consideration.

Thus, the effects of extracurricular activity participation do not appear to differ substantially by SES.

Study	Country; data source (age of participants)	Measure of participation	Measure of outcomes	Other variables	Findings
Anderson (2001)	United States; HSB (15-18 years)	Sport participation during 10th grade Sport participation during 12th grade	High school dropout College enrolment two years after 12th grade. Years of completed education, monthly earnings 10 years after 12th grade	Instrumental variables: proportion of girls and boys in student's school who participated in sports, held part-time jobs and participated in other extra-curricular activities. Controls: age, handicap status, base year standardised test scores, family income, parental education, number of siblings, geographic location, city status, type of school, percentage students white, student/ teacher ratio, total school enrolment, percentage teachers with higher degree, per pupil expenditures, whether school has minimum GPA to participate in athletics	Participation negatively associated with high school dropout for white but not minority students. Participation positively associated with college enrolment for white but not minority students. No association with years of completed education or earnings.
Broh (2002)	United States; NELS:88 (15-18 years)	Participation in interscholastic sports in both 10th and 12th grade Participation in both 10th and 12th grade in: interscholastic sport, recreational sports, cheerleading, school music groups, school drama, student council, yearbook/ journalism, vocational clubs (all considered simultaneously)	12th grade mathematics and English GPA, mathematics and reading standardised test scores	Controls: 10th grade measures of all outcomes, 10th grade only interscholastic sport participation, 12th grade only interscholastic sport participation, gender, race, family income, parents' educational attainment, family structure, school classification, school geographic location, school size	Sport participation positively associated with grades and mathematics standardised test scores compared to no participation at either time point. No effect on reading test score. Interscholastic sports and school music positively associated with grades and mathematics test scores. Student council positively associated with grades but not test scores. Drama positively associated with English grades and reading test scores. Yearbook/ journalism positively associated with English grades. Vocational clubs and recreational sports negatively associated with all outcomes. Cheerleading unrelated to all outcomes.
Cabane and Clark (2015)	United States; Add	Team sport participation at age 12-18	Employment, job satisfaction, managerial	Controls: race; parental education; at age 24-32: age, education, work experience, number of children, health, number of working hours	For men, sport participation positively predicted managerial responsibilities and

	Health (12-18 years)		responsibilities, job autonomy, and earnings at age 24-32		job autonomy. No effect on earnings or employment. No effects for women.
Crispin (2016)	United States; NELS:88 (15-16 years)	10th grade participation in athletics or other clubs (excluding academic and arts clubs)	Dropping out of school	Instrumental variables: extracurricular offerings per student, state-level eligibility requirements Controls: race, gender, computer/ newspaper/ book availability at home, prior test scores, neighbourhood median income, neighbourhood racial composition, average hours spent on homework and working, share of teachers with higher degree, teacher/ student ratio, lowest and highest teacher salary, school days per year, classes per day, racial composition of school, percentage of students in remedial math/ English, urbanicity, Census division indicator Interaction term: at-risk status (low family or school SES) x activity participation	Participants have lower risk of dropping out than non-participants. The effect is weaker for at-risk students.
Darling et al. (2005)	United States; 2462 California students (14-18 years)	Consistency of participation in school-based activities measured at Time 1 and Time 2, two years later. Any participation at Time 2.	Grades, attitudes toward school, academic aspirations at Time 2	Controls: grade, gender, parent education, ethnicity, Time 1 level of outcome variable Interaction term: parent education x Time 2 participation	Any participation positively predicted all outcomes. Consistent (Time 1 and Time 2) participation positively predicted all outcomes relative to non-participation. Participation at either Time 1 or Time 2 only was generally statistically indistinguishable from non-participation. Interaction term insignificant.
Eccles and Barber (1999)	United States; Michigan Study of Adolescent Life Transitions (15-16 years)	10th grade activity participation by category: prosocial, performance, team sports, school involvement, academic clubs	12th grade attachment to school, GPA. College enrolment status at age 21	Controls: gender, mother's education, ninth grade aptitude test results	Participation in all categories predicted higher GPA. Participation in sports, school involvement and academic clubs positively predicted college enrolment. Participation in sports predicted school attachment.

Eide and Ronan (2001)	United States; HSB (15-18 years)	Sport participation in 10th grade Sport participation in 12th grade	Dropout College enrolment, college graduation, earnings 10 years after high school	Instrumental variable: height Controls: body mass index, private school, Catholic school, urbanicity, region, academic high school program, family income, parental education, percentage students black, percentage students Hispanic, percentage teachers with higher degree, student/ teacher ratio, district expenditures, school expenditures, school enrolment	Sport participation did not affect any outcomes for the full sample of males. Positive effect on college attendance and earnings for black males only. Positive effect on college attendance and graduation for full sample of females and white females. No effect for black and Hispanic females or on dropout and earnings.
Eisman et al. (2017)	United States; 681 African-American adolescents at risk for dropout (14-18 years)	Trajectory of activity participation in high school: low and decreasing, moderate and consistent, moderate and increasing	Educational attainment in mid-30s	Controls: parental education; ninth grade: depressive symptoms, self-acceptance, substance use, GPA	Trajectory membership not associated with educational attainment.
Foster and Jenkins (2017)	United States; PSID-CDS (5-18 years)	Dance, drama or music lessons	Five years after participation measured: reading and mathematics achievement, short-term working memory, ability self-concept At age 18-24: high school completion, high school GPA, earnings	Propensity score weights calculated from: gender, siblings, race, prior reading/ mathematics scores, behaviour problems, positive behaviours, ability self-concepts, low birthweight, repeated grade, involvement in other extracurricular activities, activity limitations, health conditions, vision or hearing impairments, overall health status, family structure, parent IQ, parental education, parent work status, five-year average family income, child-specific expenditures, assets, number of times child has changed schools, HOME scale score, family encourages hobbies, warmth toward child, communication with child, monitoring of child's activities, involvement in child's school activities	No statistically significant association between participation and any outcome.
Fredricks (2012)	United States; ELS:2002 (15-16 years)	10th grade number of school-based activities and time spent in school-based activities	12th grade mathematics standardised test score, GPA, educational	Controls: gender, race, income, parental education, family type, 10th grade GPA, school size	Both number of activities and time spent in activities positively related to all outcomes.

			expectations. Educational attainment two years after 12th grade.		
Fredricks and Eccles (2006)	United States; Maryland Adolescent Development in Context Study (MADICS) (16-17 years)	11th grade school-based participation by category: school clubs, sports, prosocial activities. Total number of activity contexts.	11th grade GPA, educational expectations. Educational attainment one year after 12th grade	Controls: gender, race, parental education, parent perception of child's motivation in eighth grade, eighth grade level of outcome variable/ eighth grade educational expectations for model predicting educational attainment Mediator: 11th grade GPA for model predicting educational attainment Interaction terms: income x each activity category	Total number of activity contexts, school clubs and sports positively associated with all three outcomes. Prosocial activities positively associated with educational expectations and educational attainment but not grades. Total activity contexts, school clubs and sport participation predicted educational attainment after controlling for 11th grade GPA but prosocial activities was no longer a significant predictor. Interaction terms insignificant in majority of models.
Fredricks and Eccles (2010)	United States; MADICS (16-17 years)	Total number of school- and community-based activities in 11th grade	GPA, educational expectations in 11th grade. Educational attainment one year after 12th grade	Controls: gender, race, SES, parent perception of child's motivation in eighth grade, eighth grade level of outcome variable/ eighth grade educational expectations for model predicting educational attainment Interaction terms: SES x number of activities, SES x quadratic of number of activities	Positive association between number of activities and all outcomes. Interaction terms statistically insignificant.
Gardner et al. (2008)	United States; NELS:88 (15-18 years)	Consistency of participation in 10th and 12th grades for school- and community-based activities. Average time in activities in 10th and 12th grades	Post-secondary educational attendance two years after 12th grade. Post-secondary educational completion, employment and income eight years after 12th grade	Controls: gender; race; SES; average of 10th and 12th grade scores of: mathematics and reading standardised test scores, getting into trouble, parents' knowledge of their children's friends' parents	Consistency of participation and time spent in both school- and community-based activities positively associated with post-secondary attendance and completion. Neither measure of participation was associated with employment or income.

Geagea, MacCallum, Vernon, and Barber (2017)	Australia; YAPS-WA (13-17 years)	School-based arts activity participation	Trajectories of school satisfaction and university expectations over high school	Controls: school's ICSEA	School arts participation associated with higher levels of school satisfaction and university expectation over time.
Gorry (2016)	United States; Add Health (12-18 years)	Sport participation	Concurrent GPA; 14 years later: high school graduation status, employment status, welfare recipiency status, earnings	Instrumental variables: school size, private school status	Sport participation positively affects GPA and high school graduation. No effect on labour market outcomes. Splitting up sample by parental education indicates similar benefits regardless of parental education.
Im et al. (2016)	United States; 483 students who scored below the median on literacy in kindergarten (12-14 years)	Consistency of participation in seventh and eighth grades in school-based sport and non-sport (performing arts, academic clubs, other school clubs) activities	Ninth grade academic competence belief, valuing of education, language arts grade, teacher-rated classroom engagement	Propensity score weights calculated based on fourth or fifth grade measures of: gender, race, bilingual class, economic disadvantage, parental employment, parental education, emotional symptoms, conduct problems, hyperactivity, peer problems, prosocial behaviours, dominant language, standardised reading score, standardised mathematics score, teacher-student warmth, mathematics/ reading/ sport competence beliefs, valuing of mathematics/ reading achievement, overall academic competence, valuing of overall achievement, valuing of sport, overall scholastic competence, social competence, athletic competence, school belonging, classroom performance approach/ avoidance goal structure, friends' prosocial orientation, victimisation in classroom, locus of control, peer affiliation structured activities, home-school relationship, parental school involvement, classroom behavioural engagement	Continuous participation in sport positively associated with academic competence beliefs and valuing of education relative to non-participation. Sport participation in eighth grade only associated with higher valuing of education. No relationship between sport participation and grades or classroom engagement. Continuous or eighth grade only non-sport participation positively associated with academic competence belief, classroom engagement and grades. Seventh grade only non-sport participation positively associated with academic competence beliefs.
Kosteas (2010)	United States; National Longitudinal Survey of Youth 1979	Number of high school clubs; participation by category: athletics, academic, non-academic clubs	Average weekly earnings at age 42-49 (deviation from household mean)	Controls: gender, race, age, age squared, tenure, years of schooling, Armed Forces Qualification Test score, average weekly hours worked, covered by union contract, year, industry, occupation, work experience, number of children, health	Household fixed effects estimation. Number of clubs, athletics and academic clubs positively associated with earnings. Participation in non-academic clubs negatively associated with earnings.

	(NLSY79) (14-18 years)			Instrumental variable: siblings' club participation, birth order	Number of clubs and athletics positively associated with earnings. Participation in academic and non-academic clubs not related to earnings.
Lipscomb (2007)	United States; NELS:88 (13-18 years)	Any sport participation, any club participation	Mathematics and science test scores, educational expectations	Controls: parental divorce/ death; changes in: urban school, private school, school enrolment size, truancy, self-esteem index, weekly homework hours, weekday television hours, intensity of job commitments	Fixed effects estimation. Sport participation positively associated with mathematics and science test scores and educational expectations. Club participation positively associated with mathematics test scores and educational expectations but not science test scores.
Lleras (2008)	United States; NELS:88 (15-16 years)	10^{th} grade number of activities by category: sports, academic, fine arts	Educational attainment and earnings eight years after 12^{th} grade	Controls measured in 10^{th} grade: family SES, gender, race, standardised test scores, homework completion, teacher ratings of behaviours (hard-working, tardy, passive, relates to other students, disruptive in class), educational attainment (for model predicting earnings) Interaction terms: family SES x each activity variable	Sports and academic activities modestly but positively associated with educational attainment and earnings. Fine arts not associated with educational attainment and negatively associated with earnings. Students from lower SES backgrounds experienced larger gain in earnings from participation in sport and academic activities. Interactions insignificant in predicting educational attainment.
Lunn and Kelly (2015)	Ireland; School Leavers' Survey (12-17 years)	Participation in organised school-based sport during early or later high school years	Participation in further education and training, employment or unemployment two years after leaving school	Propensity scores calculated based on: gender, illness/ disability, parental occupation, maternal education, participation in transition year, private tuition in final year, employment during and outside of term school type, truancy, individual motivation, teacher support, classroom context, highest level of examination sat	Participation in sport in early or later high school years did not predict post-school pathway. Dropping out of sport from early to later high school years associated with reduced likelihood of being in further education or training relative to participation in later high school years.
Mahoney and Vest (2012)	United States; PSID-CDS (12-18 years)	Any organised activity participation; weekly time in organised activities	Educational attainment at age 18-24	Controls: age, gender, race, family income, maternal education, neighbourhood safety, parental weekly work hours, primary carer's marital status, number of children in the home, prior: frequency of smoking, alcohol use, marijuana use, internalising behaviour	Any activity participation and time in activities positively associated with educational attainment.

				problems, flourishing, externalising behaviour problems, reading and mathematics standardised test scores Interaction terms: family income x each activity variable	 No interactions significant.
Marsh (1992)	United States; HSB (15-18 years)	Sum of 10th and 12th grade school- and non-school-based activities	12th grade standardised test scores, grades, academic track, homework, absenteeism, educational aspirations, occupational aspirations, academic self-concept Two years after 12th grade: unemployment, college enrolment. educational aspirations, occupational aspirations	Controls: gender, SES, race, public school, repeated grade, college expectations, kindergarten attendance, urbanicity, mother works, school year size, 10th grade level of all outcomes Interaction terms: SES x activity participation	Number of activities positively associated with grades, academic track, time spent on homework, absenteeism, 12th grade and post-secondary educational aspirations, 12th grade occupational aspirations, academic self-concept, college enrolment. Some interaction terms were significant and indicated that low SES students benefited more than high SES students. However, the additional variance explained by these terms was very low.
Marsh and Kleitman (2002)	United States; NELS:88 (15-18 years)	Sum of 10th and 12th grade number of school-based activities, time spent on school-based activities, number of non-school-based activities	12th grade standardised test scores, grades, homework, attendance, parental expectations, educational aspirations, occupational aspirations, school preparation, number of university applications, Carnegie units. Two	Controls: gender, SES, race, public school, repeated grade, rural, mother works, school year size, parental education, eighth and 10th grade levels of all outcomes	Number of school-based activities positively associated with all outcomes except attendance and unemployment. Negatively associated with standardised test scores. Time in school-based activities positively associated with all outcomes except standardised test scores, attendance and unemployment. Non-school-based activities positively predicted six outcomes (homework, parental expectations, educational aspirations, occupational aspirations, university applications, post-secondary educational aspirations) but was

			years after 12th grade: months college attendance, status of enrolment, educational aspirations, highest level of education, unemployment	Interaction terms: SES x each activity variable	negatively associated with standardised test scores and grades. Some interaction terms significant, indicating greater benefit for students from lower SES background.
Martin et al. (2013)	Australia; 643 students (10-18 years)	Weekly time in external arts tuition	Academic motivation, academic intentions, academic buoyancy, enjoyment of school, participation in class, completion of homework	Controls: gender, age, non-English speaking, parental education, prior academic achievement, other forms of art participation, prior level of outcome variable	External arts tuition negatively associated with all outcomes except academic buoyancy.
McNeal (1995)	United States; HSB (14-18 years)	School-based activity participation by category: athletics, fine arts, academic clubs, vocational clubs	Dropout	Controls: gender, race, age, SES, single-headed household, academic ability, academic track, vocational track, hours of employment	Sports and fine arts associated with reduced probability of dropping out. Academic and vocational clubs not associated with dropout.
Morris (2015)	United States; ELS:2002 (15-18 years)	10th grade time in organised activities	12th grade mathematics test score	Controls: 10th grade mathematics and reading test scores, age, gender, race, urbanicity, family structure, academic track placement, school sector, school SES, school region	Model estimated separately for each family SES quintile and parental education category. Time in activities positively predicted mathematics test scores for the lowest three quintiles and lower parental education categories only.
Morris (2016)	United States; ELS:2002 (15-16 years)	10th grade time spent in activities. Participation by category: competitive sport, recreational sport, school clubs, academic activities, community activities, arts activities	12th grade mathematics test score. College attendance two years after 12th grade	Controls: age, gender, race, parental education, curriculum track, family structure, 10th grade mathematics achievement, school sector, percentage students receiving free lunch, geographic location, urbanicity	Time in activities, academic activities and school clubs positively related to mathematics achievement and college attendance. Competitive sports positively predicted college attendance but not related to mathematics achievement. Recreational sports negatively related to both outcomes. Arts and community activities not related to either outcome.

				Interaction terms: family income x each activity variable	No interaction term statistically significant.
Pfeifer and Cornelißen (2010)	Germany; German Socio-Economic Panel	Any sport participation during adolescence	Lifetime educational attainment	Instrumental variables: height, city size	Sport participation positively associated with attainment of higher status high school degree.
Ransom and Ransom (2017)	United States; NLSY79 (14-18 years), NELS:88 (15-18 years), Add Health (12-18 years)	NLSY79: any sport participation during high school NELS:88: sport participation in 10th or 12th grade Add Health: any sport participation during high school	High school graduation, college attendance, college graduation, wages, full-time employment at age 25	NLSY79 controls: cognitive score, noncognitive score, race, mother's education, father's education, family structure, family income NELS:88 controls: cognitive score, race, mother college graduate, father college graduate, family structure, family income, handicap, school size, public school, religious school, private school, urbanicity Add Health controls: cognitive score, race, mother's education, father's education, family structure, school size, urbanicity, percentage students white	For most datasets and outcomes, if selection on unobservables is even a moderate fraction of selection on observable controls, sport participation has no impact. More robust results for positive effect on college attendance and wages for men in NELS:88, but these findings are statistically indistinguishable from zero if selection on unobservables is equal to selection on observables.
Rees and Sabia (2010)	United States; Add Health (14-18 years)	Frequency of sport participation Any sport participation	GPA, college aspirations, attention in class, homework completion	Instrumental variable: height Controls: cognitive ability, puberty, age, race, region, urbanicity, household income, grade in school, parental education, single-parent household, average class size, public school, percentage of students in college preparatory classes, school size, parental involvement in education, body mass index, self-report physical health, depression, friend or family member attempted suicide, religious attendance	Fixed effects estimation: positive association between sport participation and GPA, college aspirations, and reduced difficulty completing homework. No association with attention in class. No relationships between sport participation and GPA, college aspirations, or homework completion. Participation positively associated with difficulty paying attention in class.
Shulruf, Tumen, and	New Zealand; one Auckland	At least weekly school-based participation by	Difference in literacy and numeracy test score (term one to	Controls: gender, race, SES, aptitude test score	No evidence that participation in any of the activities or activity clusters tested affects test scores or attitudes.

Tolley (2008)	school (13-18 years)	category (team sport, individual support, performance arts, academic support, community activity, business/ skills, music, academic support, hobby, community service) and in individual activities	term four), attitudes to literacy and numeracy		
Stevenson (2010)	United States; 1980 and 2000 Censuses of Population, National High School Athletic Participation Survey (14-18 years)	Female athletics participation	Years in education, employment status	Instrumental variable: state level of male athletics participation prior to introduction of Title IX [legislation which required schools to increase female participation levels to achieve parity with male levels]	Female athletics participation positively associated with years of education and employment.
Troutman and Dufur (2007)	United States; NELS:88 (15-18 years)	Interscholastic sport participation in 10^{th} or 12^{th} grade	Completion of Bachelor's degree or higher six years after 12^{th} grade	Controls: educational expectations, standardised test scores, SES, family size and composition, race, type of school, school neighbourhood, participation in intercollegiate sport	Sport participation positively predicted college completion.
Zaff et al. (2003)	United States; NELS:88 (13-18 years)	Consistency of participation in 8^{th}, 10^{th} and 12^{th} grade in school- or community-based activities	College attendance two years after 12^{th} grade	Controls (measured in eighth grade): family SES, race, gender, family composition, number of siblings, reading and mathematics test scores, held back before eighth grade, disability, emotional disability, locus of control, religiosity, turbulent events, private school, parental monitoring and school involvement, peer influence, school problems	Participation in at least one activity in each grade associated with higher likelihood of attending college than occasional participation. Occasional participation associated with higher likelihood of attending college than no participation.

Table 2: Selected studies examining consequences of extracurricular activity participation

4. Discussion and conclusions

Summary

We reviewed the literature on inequality in extracurricular activity participation, and the potential consequences of differing levels of participation for academic and labour market outcomes.

Extracurricular activity participation is stratified by SES. Youth from lower SES families and communities are less likely to participate in any kind of extracurricular activity, and more likely to participate in sports alone. Material resource constraints explain a large part of this difference, but non-material resources and cultural values are also important.

To the extent that extracurricular activities have intrinsic value as leisure activities for youth, this pattern is concerning and suggests another area of inequality between high and low SES youth. In this paper, however, we were concerned with the possibility that the gap contributed to the intergenerational transmission of inequality, if participation conferred educational and employment advantages which non-participating low SES youth missed out on.

We found that the literature generally supports the claim that participation leads to higher academic grades and college enrolment, though there were some questions about the meaningfulness of the effect sizes. However, there was insufficient evidence to conclude that extracurricular activity participation affected standardised test scores, post-secondary educational attainment, or labour market outcomes. There was no evidence that extracurricular activities had different effects for low SES youth compared to other youth. Thus, there is little support in the existing literature for the hypothesis that differences in extracurricular activity participation rates significantly contribute to the intergenerational transmission of disadvantage.

Implications for research

This review has highlighted the paucity of high quality work from which causal conclusions about the effects of extracurricular activities can be drawn. Given the near-axiomatic status of the benefits of extracurricular participation, and the large amounts of time and money devoted to these activities, this was an unexpected finding.

The key issue in the literature is self-selection; it is difficult to disentangle the causal effects of extracurricular activities from the fact that more motivated, higher functioning adolescents are more likely both to participate in extracurricular activities and to achieve better academic and labour market outcomes. The two most common approaches to this problem are instrumental variable estimation and controlling for selection on a range of observed variables or a baseline measure of the outcome under consideration. Both techniques must be applied carefully.

Many studies claim to have found causal effects after controlling only for basic demographic characteristics. These effects are likely often spurious. Studies which move from such a basic specification to one which includes a wider range of covariates typically find that the estimates of the effect of extracurricular activities decrease substantially (Stevenson, 2010; Zaff et al., 2003). As such, the large volume of literature reporting positive associations between extracurricular activities and outcomes should not be interpreted as overwhelming evidence that extracurricular activities positively affect outcomes. This review has focussed on the smaller number of better-designed longitudinal studies, which typically control for a baseline measure of the outcome variable or, when such a measure is not available (as when predicting college enrolment, for example), baseline measures of a range of related academic variables. Such techniques provide much stronger evidence of causal effects, and should be the standard in the literature.

Researchers using instrumental variables to estimate the effect of extracurricular activities often fail to adequately establish the validity of their instruments. In some cases, instruments are unambiguously correlated with the dependent variable through channels other than extracurricular activities (e.g. Barron, Ewing, & Waddell, 2000; Eide & Ronan, 2001; Gorry, 2016). In other cases, the authors attempt to deal with the issue by controlling for some of these channels and then claim a ‘conditional’ satisfaction of the exclusion restriction (e.g. Anderson, 2001; Rees & Sabia, 2010). Typically, though, these controls do not encompass the full array of channels through which an instrument might be correlated with the dependent variable. As such, instrumental variable studies need to be interpreted with caution and instruments selected with great care. Stevenson’s (2010) natural experiment study provides the only example of a credibly exogenous instrument in the literature. The exploitation of other natural experiments could significantly further knowledge of the causal effects of extracurricular activities.

We found that the literature supported different conclusions regarding the effects of extracurricular activities on grades compared to standardised test scores, and on college attendance as opposed to college graduation. There was fairly strong evidence that extracurricular activities positively affected grades and college attendance, but we could not draw the same conclusion with respect to test scores and college graduation or educational attainment. These differences may simply reflect the scarcity of high quality work, rather than indicating that extracurricular activities do not affect test scores or graduation. If, however, these differences were substantive, they may be informative about the mechanism by which extracurricular activities positively affect grades and college enrolment. These effects may be attributable to positive teacher or admissions officer perceptions about extracurricular activity participation, rather than because the activities foster particular cognitive or noncognitive skills, for example. This hypothesis is speculative, and highlights the need to consider different types of academic, educational and employment outcomes.

Another notable absence in the literature is the lack of work from countries other than the United States. Given differences in educational systems (in particular, tertiary admissions) and culture between the United States and Australia and other countries, this limits the confidence with which we can draw conclusions from the existing literature about the effects of extracurricular activities for non-American youth today. International work is needed to determine the generalisability of the existing literature.

Conclusion

Despite the stratified patterns of extracurricular participation, we found little evidence that differences in extracurricular activity participation significantly contribute to socioeconomic differences in achievement in Australia. Though participation may positively affect grades, we found inconsistent evidence of its effect on high school and college graduation and labour market outcomes. Though we found that participation positively affected college enrolment, this may be unique to the United States.

We sought to determine if socioeconomic differences in extracurricular activity participation contributed to lower SES youths' poorer academic, educational, and labour market outcomes, and ultimately to the intergenerational transmission of inequality. While more high quality work is needed to confidently answer this question, there is currently little support for this hypothesis.

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